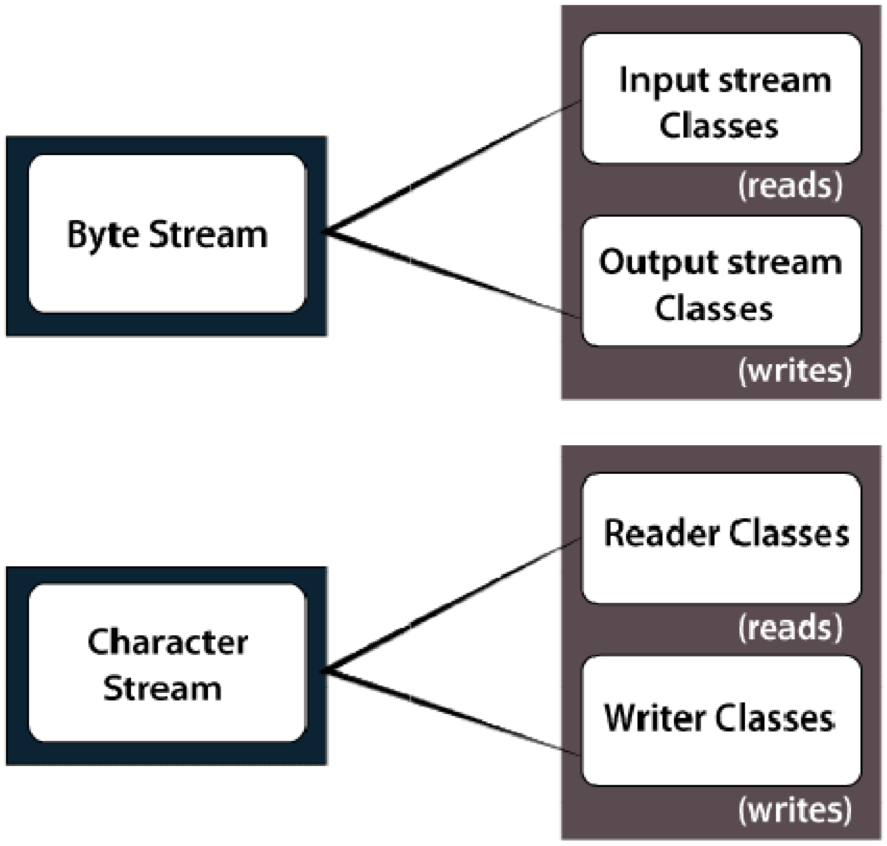
File Operations in Java

In Java, a **File** is an abstract data type. A named location used to store related information is known as a **File**. There are several **File Operations** like **creating a new File, getting information about File, writing into a File, reading from a File** and **deleting a File**.

Before understanding the File operations, it is required that we should have knowledge of **Stream** and **File methods**. If you have knowledge about both of them, you can skip it.

Stream

A series of data is referred to as **a stream**. In Java, **Stream** is classified into two types, i.e., **Byte Stream** and **Character Stream**.



Brief classification of I/O streams

Byte Stream

Byte Stream is mainly involved with byte data. A file handling process with a byte stream is a process in which an input is provided and executed with the byte data.

Character Stream

Character Stream is mainly involved with character data. A file handling process with a character stream is a process in which an input is provided and executed with the character data.

To get more knowledge about the stream, click here.

Java File Class Methods

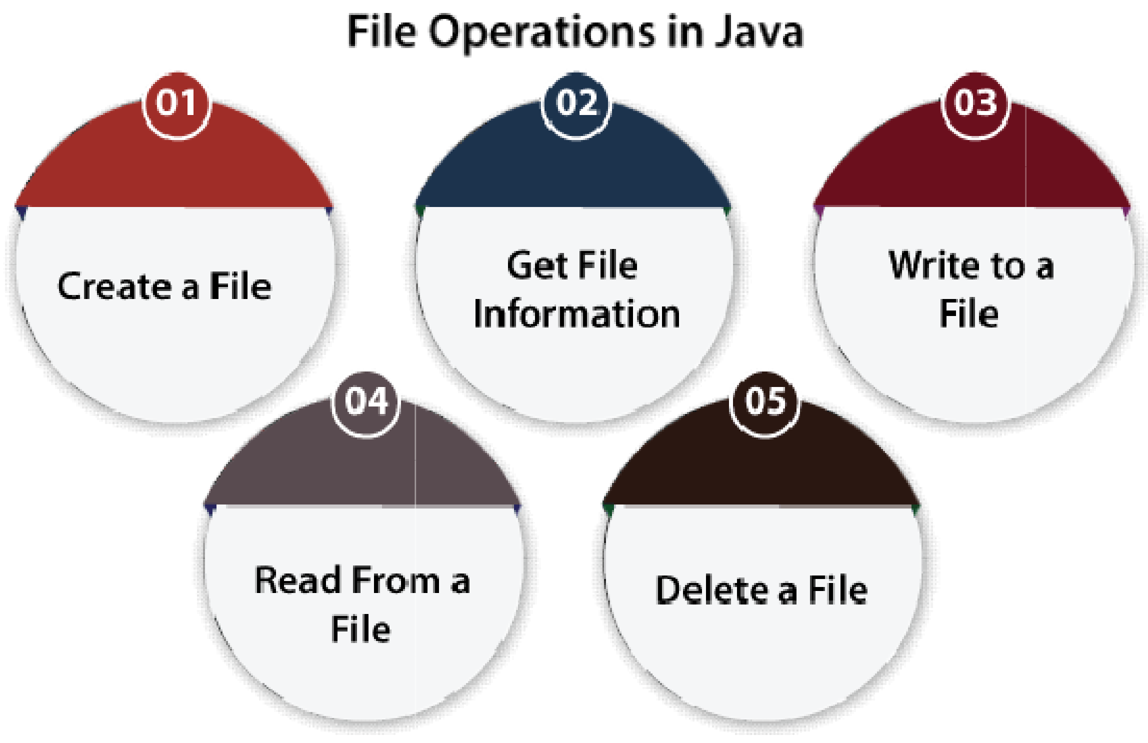
S.No.	Method	Return Type	Description
1.	canRead()	Boolean	The **canRead()** method is used to check whether we can read the data of the file or not.
2.	createNewFile()	Boolean	The **createNewFile()** method is used to create a new empty file.
3.	canWrite()	Boolean	The **canWrite()** method is used to check whether we can write the data into the file or not.
4.	exists()	Boolean	The **exists()** method is used to check whether the specified file is present or not.
5.	delete()	Boolean	The **delete()** method is used to delete a file.
6.	getName()	String	The **getName()** method is used to find the file name.
7.	getAbsolutePath()	String	The **getAbsolutePath()** method is used to get the absolute pathname of the file.
8.	length()	Long	The **length()** method is used to get the size of the file in bytes.

9.	list()	String[]	The **list()** method is used to get an array of the files available in the directory.
10.	mkdir()	Boolean	The **mkdir()** method is used for creating a new directory.

File Operations

We can perform the following operation on a file:

- Create a File
- Get File Information
- Write to a File
- Read from a File
- Delete a File



Create a File

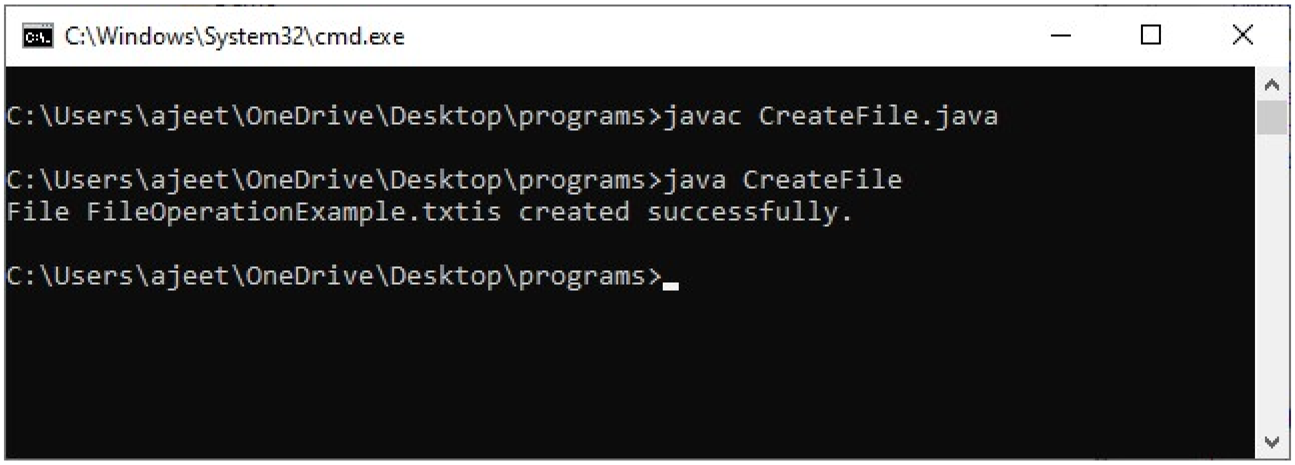
Create a File operation is performed to create a new file. We use the **createNewFile()** method of file. The **createNewFile()** method returns true when it successfully creates a new file and returns false when the file already exists.

Let's take an example of creating a file to understand how we can use the **createNewFile()** method to perform this operation.

CreateFile.java

```java
// Importing File class
import java.io.File;
// Importing the IOException class for handling errors
import java.io.IOException;
 class CreateFile {
        public static void main(String args[]) {
        try {
            // Creating an object of a file
            File f0 = new File("D:FileOperationExample.txt");
            if (f0.createNewFile()) {
                System.out.println("File " + f0.getName() + " is created successfully.");
            } else {
                System.out.println("File is already exist in the directory.");
            }
          } catch (IOException exception) {
              System.out.println("An unexpected error is occurred.");
              exception.printStackTrace();
          }
    }
}
```

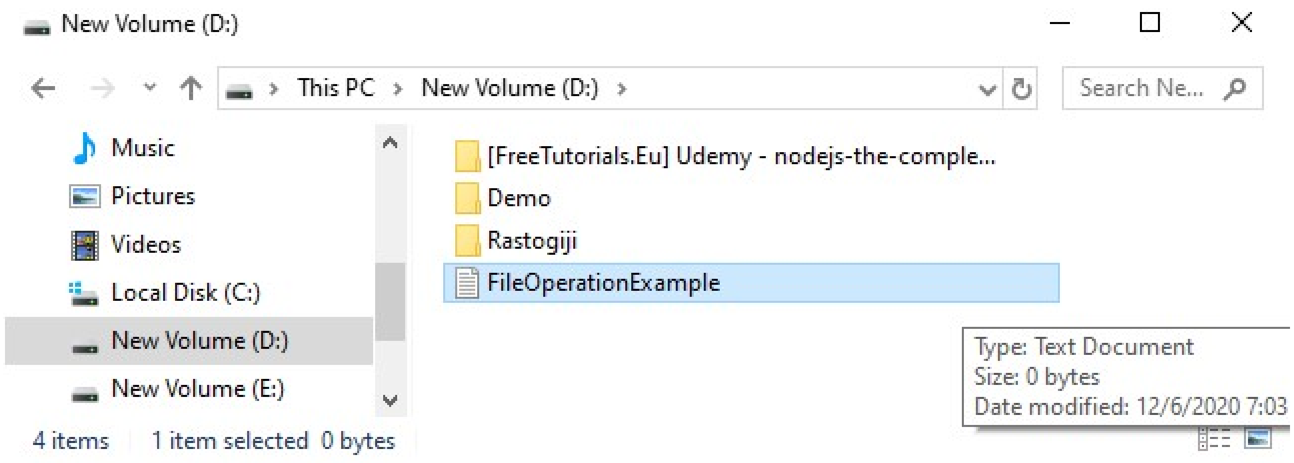
Output:



```
C:\Users\ajeet\OneDrive\Desktop\programs>javac CreateFile.java

C:\Users\ajeet\OneDrive\Desktop\programs>java CreateFile
File FileOperationExample.txtis created successfully.

C:\Users\ajeet\OneDrive\Desktop\programs>_
```



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FileOperationExample

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Explanation:

In the above code, we import the File and IOException class for performing file operation and handling errors, respectively. We create the **f0** object of the File class and specify the location of the directory where we want to create a file. In the try block, we call the **createNewFile()** method through the **f0** object to create a new file in the specified location. If the method returns false, it will jump to the else section. If there is any error, it gets handled in the catch block.

Get File Information

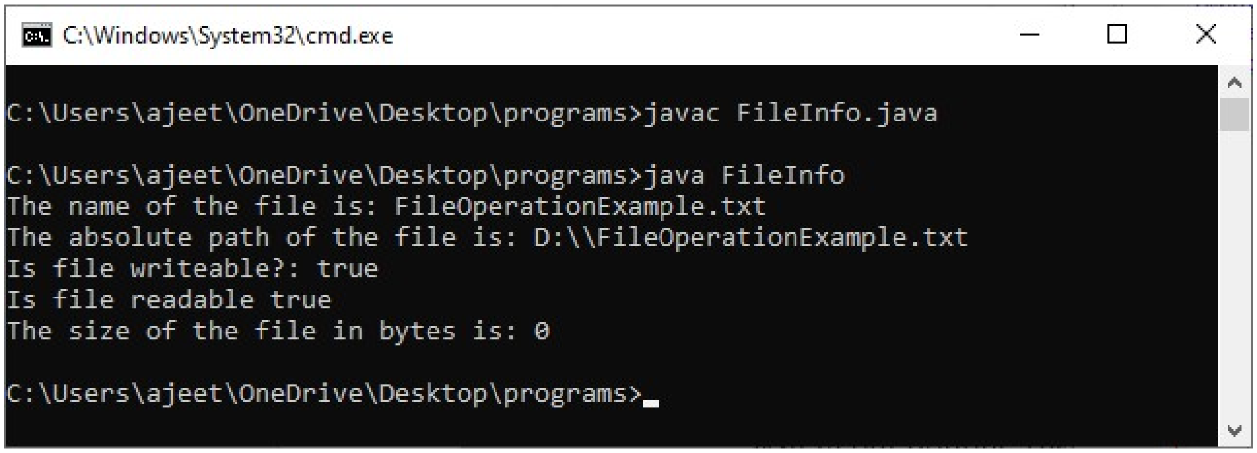
The operation is performed to get the file information. We use several methods to get the information about the file like name, absolute path, is readable, is writable and length.

Let's take an example to understand how to use file methods to get the information of the file.

FileInfo.java

```java
// Import the File class
import java.io.File;
class FileInfo {
  public static void main(String[] args) {
    // Creating file object
    File f0 = new File("D:FileOperationExample.txt");
    if (f0.exists()) {
      // Getting file name
      System.out.println("The name of the file is: " + f0.getName());

      // Getting path of the file
      System.out.println("The absolute path of the file is: " + f0.getAbsolutePath());

      // Checking whether the file is writable or not
      System.out.println("Is file writeable?: " + f0.canWrite());

      // Checking whether the file is readable or not
      System.out.println("Is file readable " + f0.canRead());

      // Getting the length of the file in bytes
      System.out.println("The size of the file in bytes is: " + f0.length());
    } else {
      System.out.println("The file does not exist.");
    }
  }
}
```

Output:



```
C:\Users\ajeet\OneDrive\Desktop\programs>javac FileInfo.java

C:\Users\ajeet\OneDrive\Desktop\programs>java FileInfo
The name of the file is: FileOperationExample.txt
The absolute path of the file is: D:\\FileOperationExample.txt
Is file writeable?: true
Is file readable true
The size of the file in bytes is: 0

C:\Users\ajeet\OneDrive\Desktop\programs>_
```

Description:

In the above code, we import the **java.io.File** package and create a class **FileInfo**. In the main method, we create an object of the text file which we have created in our previous example. We check the existence of the file using a conditional statement, and if it is present, we get the following information about that file:

1. We get the name of the file using the **getName()**
2. We get the absolute path of the file using the **getAbsolutePath()** method of the file.
3. We check whether we can write data into a file or not using the **canWrite()**
4. We check whether we can read the data of the file or not using the **canRead()**
5. We get the length of the file by using the **length()**

If the file doesn't exist, we show a custom message.

Write to a File

The next operation which we can perform on a file is **"writing into a file"**. In order to write data into a file, we will use the **FileWriter** class and its **write()** method together. We need to close the stream using the **close()** method to retrieve the allocated resources.

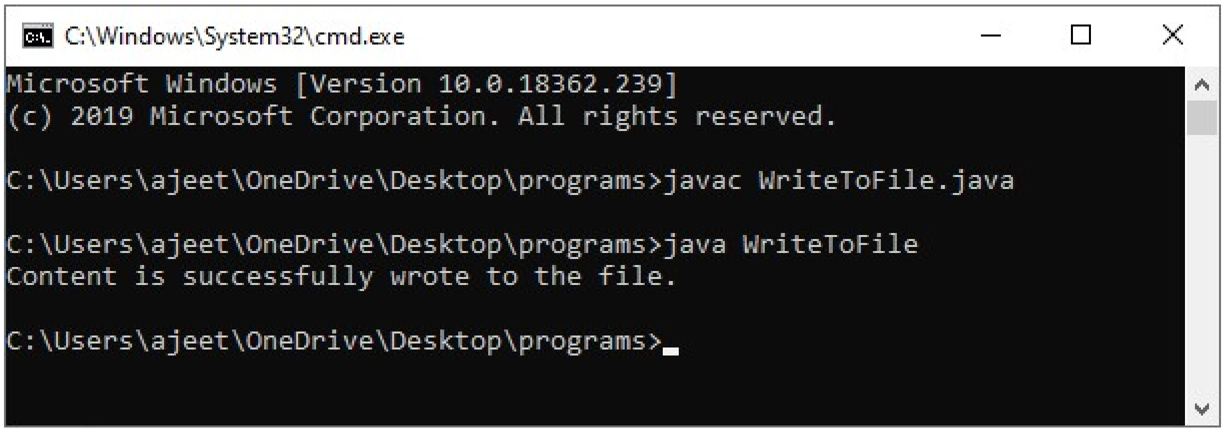
Let's take an example to understand how we can write data into a file.

WriteToFile.java

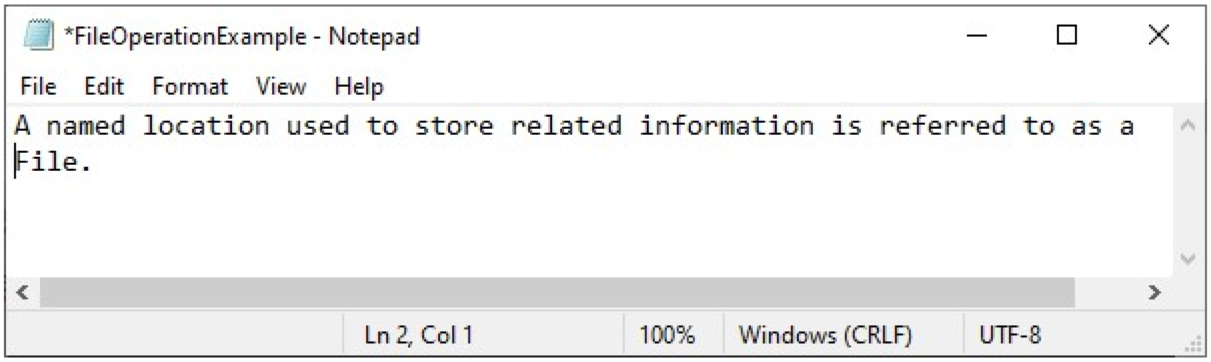
```
// Importing the FileWriter class
import java.io.FileWriter;
```

```java

// Importing the IOException class for handling errors
import java.io.IOException;

class WriteToFile {
  public static void main(String[] args) {

  try {
    FileWriter fwrite = new FileWriter("D:FileOperationExample.txt");
    // writing the content into the FileOperationExample.txt file
    fwrite.write("A named location used to store related information is referred to as a File.");

    // Closing the stream
    fwrite.close();
    System.out.println("Content is successfully wrote to the file.");
  } catch (IOException e) {
    System.out.println("Unexpected error occurred");
    e.printStackTrace();
    }
  }
}
```

Output:



```
Microsoft Windows [Version 10.0.18362.239]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\ajeet\OneDrive\Desktop\programs>javac WriteToFile.java

C:\Users\ajeet\OneDrive\Desktop\programs>java WriteToFile
Content is successfully wrote to the file.

C:\Users\ajeet\OneDrive\Desktop\programs>_
```



```
A named location used to store related information is referred to as a
File.
```

Explanation:

In the above code, we import the **java.io.FileWriter** and **java.io.IOException** classes. We create a class WriteToFile, and in its main method, we use the **try-catch** block. In the try section, we create an instance of the FileWriter class, i.e., **fwrite**. We call the **write** method of the FileWriter class and pass the content to that function which we want to write. After that, we call the **close()** method of the FileWriter class to close the file stream. After writing the content and closing the stream, we print a custom message.

If we get any error in the try section, it jumps to the catch block. In the catch block, we handle the **IOException** and print a custom message.

Read from a File

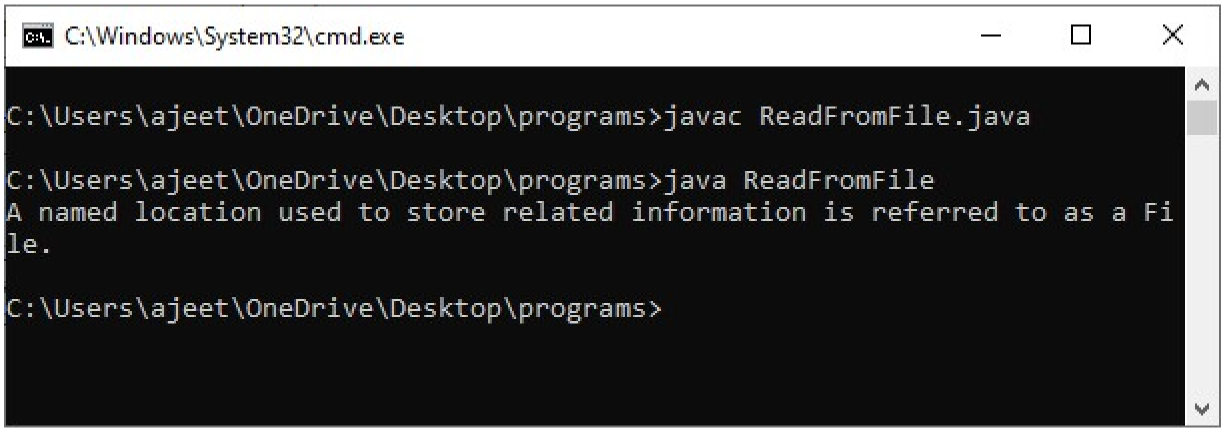
The next operation which we can perform on a file is **"read from a file"**. In order to write data into a file, we will use the **Scanner** class. Here, we need to close the stream using the **close()** method. We will create an instance of the Scanner class and use the **hasNextLine()** method **nextLine()** method to get data from the file.

Let's take an example to understand how we can read data from a file.

ReadFromFile.java

```java
// Importing the File class
import java.io.File;
// Importing FileNotFoundException class for handling errors
import java.io.FileNotFoundException;
// Importing the Scanner class for reading text files
import java.util.Scanner;

class ReadFromFile {
    public static void main(String[] args) {
        try {
            // Create f1 object of the file to read data
            File f1 = new File("D:FileOperationExample.txt");
            Scanner dataReader = new Scanner(f1);
            while (dataReader.hasNextLine()) {
                String fileData = dataReader.nextLine();
                System.out.println(fileData);
            }
            dataReader.close();
        } catch (FileNotFoundException exception) {
            System.out.println("Unexcpected error occurred!");
            exception.printStackTrace();
        }
    }
}
```

Output:



```
C:\Users\ajeet\OneDrive\Desktop\programs>javac ReadFromFile.java

C:\Users\ajeet\OneDrive\Desktop\programs>java ReadFromFile
A named location used to store related information is referred to as a Fi
le.

C:\Users\ajeet\OneDrive\Desktop\programs>
```

Expalnation:

In the above code, we import the **"java.util.Scannner", "java.io.File"** and **"java.io.IOException"** classes. We create a class **ReadFromFile**, and in its main method, we use the **try-catch block**. In the try section, we create an instance of both the **Scanner** and the **File** classes. We pass the **File** class object to the **Scanner** class object and then iterate the scanner class object using the **"While"** loop and print each line of the file. We also need to close the scanner class object, so we use the close() function. If we get any error in the try section, it jumps to the catch block. In the catch block, we handle the IOException and print a custom message.

Delete a File

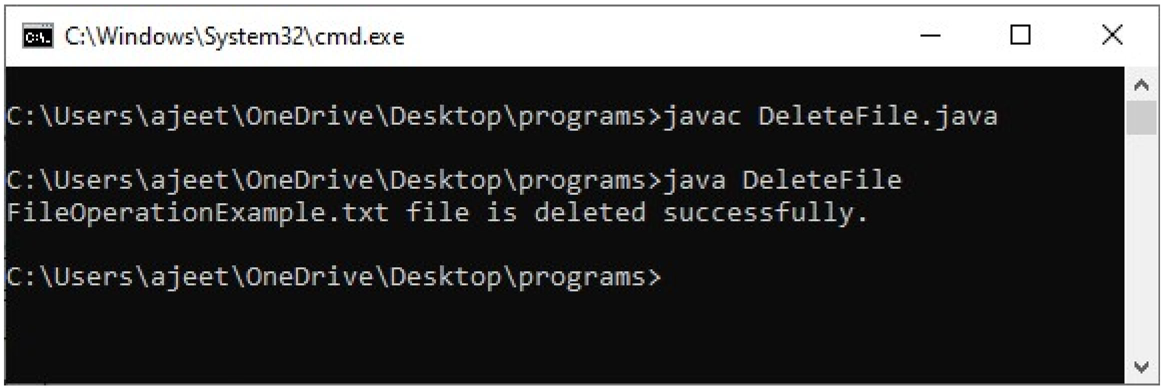
The next operation which we can perform on a file is **"deleting a file"**. In order to delete a file, we will use the **delete()** method of the file. We don't need to close the stream using the **close()** method because for deleting a file, we neither use the FileWriter class nor the Scanner class.

Let's take an example to understand how we can write data into a file.

DeleteFile.java

```
// Importing the File class
import java.io.File;
class DeleteFile {
  public static void main(String[] args) {
    File f0 = new File("D:FileOperationExample.txt");
    if (f0.delete()) {
        System.out.println(f0.getName()+ " file is deleted successfully.");
      } else {
        System.out.println("Unexpected error found in deletion of the file.");
      }
   }
}
```

Output:



```
C:\Windows\System32\cmd.exe

C:\Users\ajeet\OneDrive\Desktop\programs>javac DeleteFile.java

C:\Users\ajeet\OneDrive\Desktop\programs>java DeleteFile
FileOperationExample.txt file is deleted successfully.

C:\Users\ajeet\OneDrive\Desktop\programs>
```

Explanation:

In the above code, we import the **File** class and create a class **DeleteFile**. In the main() method of the class, we create **f0** object of the file which we want to delete. In the **if** statement, we call the **delete()** method of the file using the f0 object. If the delete() method returns true, we print the success custom message. Otherwise, it jumps to the else section where we print the unsuccessful custom message.

All the above-mentioned operations are used to read, write, delete, and create file programmatically.